



Your Personal Carbon Footprint:

Strategizing to Save Money, Save the 'Hood and Save Civilization

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"When the spirits are low, when the day appears dark, when work becomes monotonous, when hope hardly seems worth having, just mount a bicycle and go out for a spin down the road, without thought on anything but the ride you are taking."

- Arthur Conan Doyle, Scientific American, 1896

Arctic National Wildlife Refuge

- Refuge Boundary
- Wild River
- Community
- Dalton Highway
- USA-Canada Border



Prudhoe Bay

Deadhorse

Kaktovik

Beaufort Sea

1002 Area

Wilderness Area

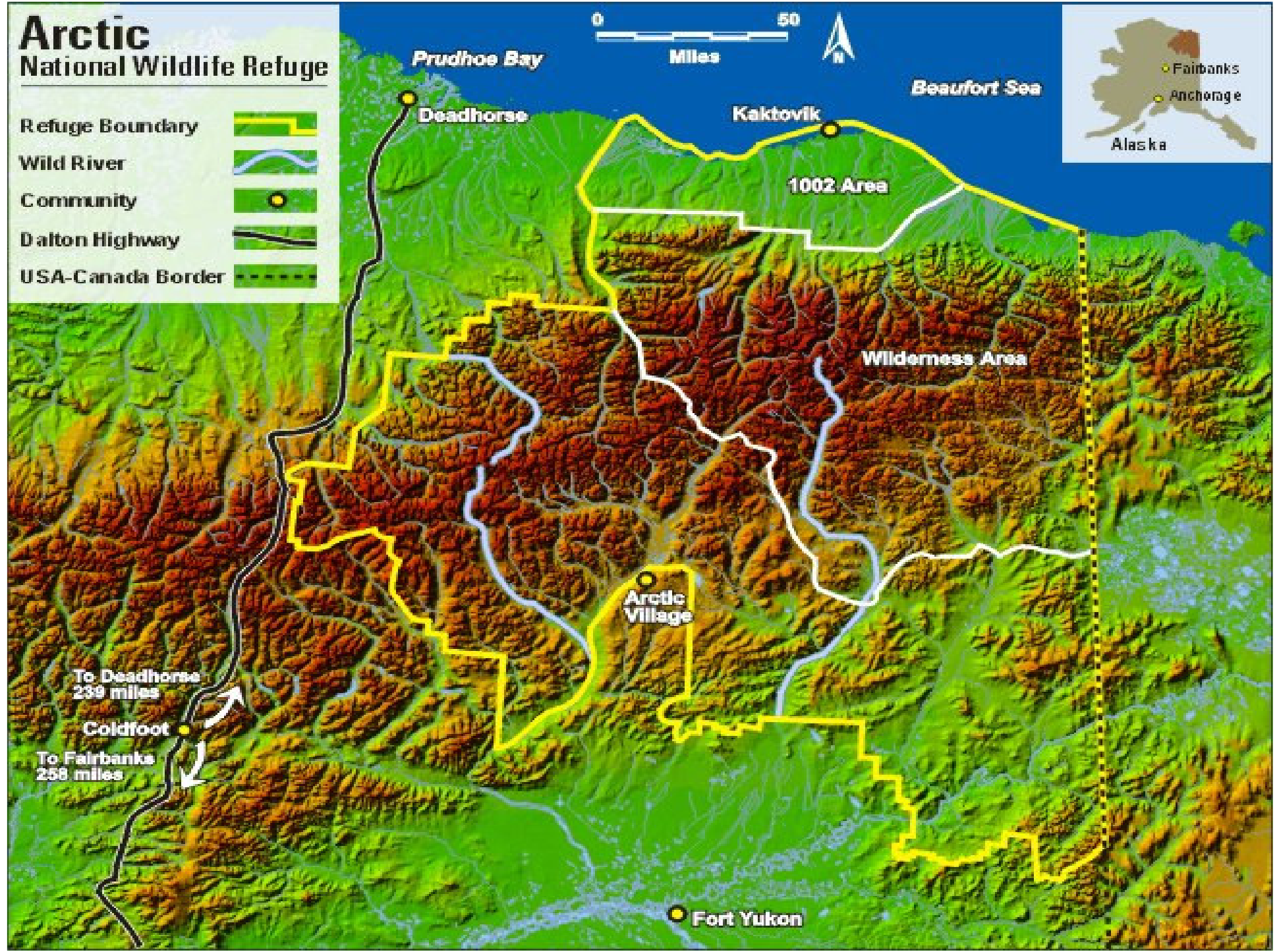
Arctic Village

Fort Yukon

To Deadhorse
239 miles

Coldfoot

To Fairbanks
258 miles









**Sheenjek River,
Alaska National Wildlife Refuge**



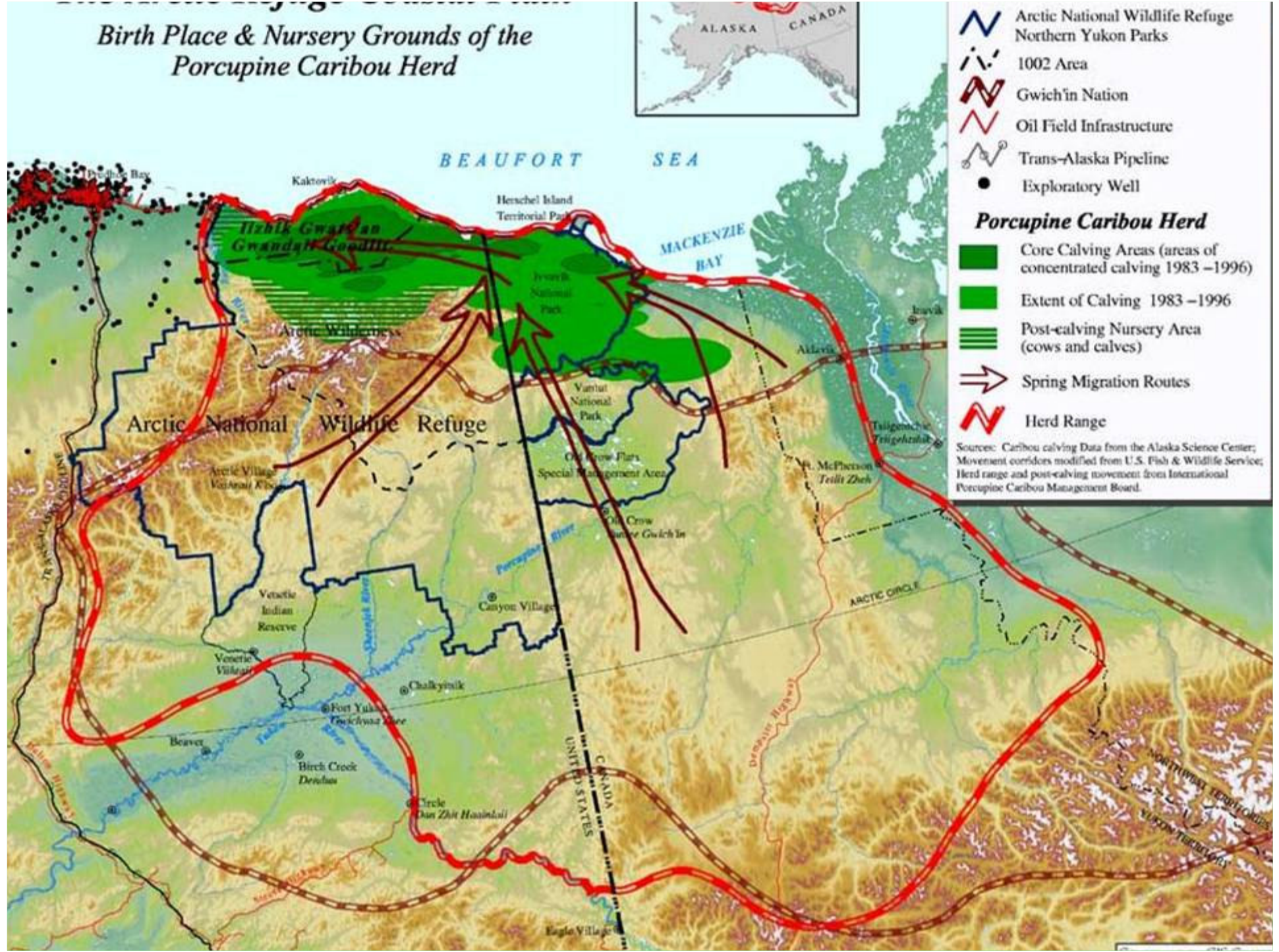








Birth Place & Nursery Grounds of the Porcupine Caribou Herd



- Arctic National Wildlife Refuge
- Northern Yukon Parks
- 1002 Area
- Gwich'in Nation
- Oil Field Infrastructure
- Trans-Alaska Pipeline
- Exploratory Well

- ### Porcupine Caribou Herd
- Core Calving Areas (areas of concentrated calving 1983–1996)
 - Extent of Calving 1983–1996
 - Post-calving Nursery Area (cows and calves)
 - Spring Migration Routes
 - Herd Range

Sources: Caribou calving Data from the Alaska Science Center; Movement corridors modified from U.S. Fish & Wildlife Service; Herd range and post-calving movement from International Porcupine Caribou Management Board.



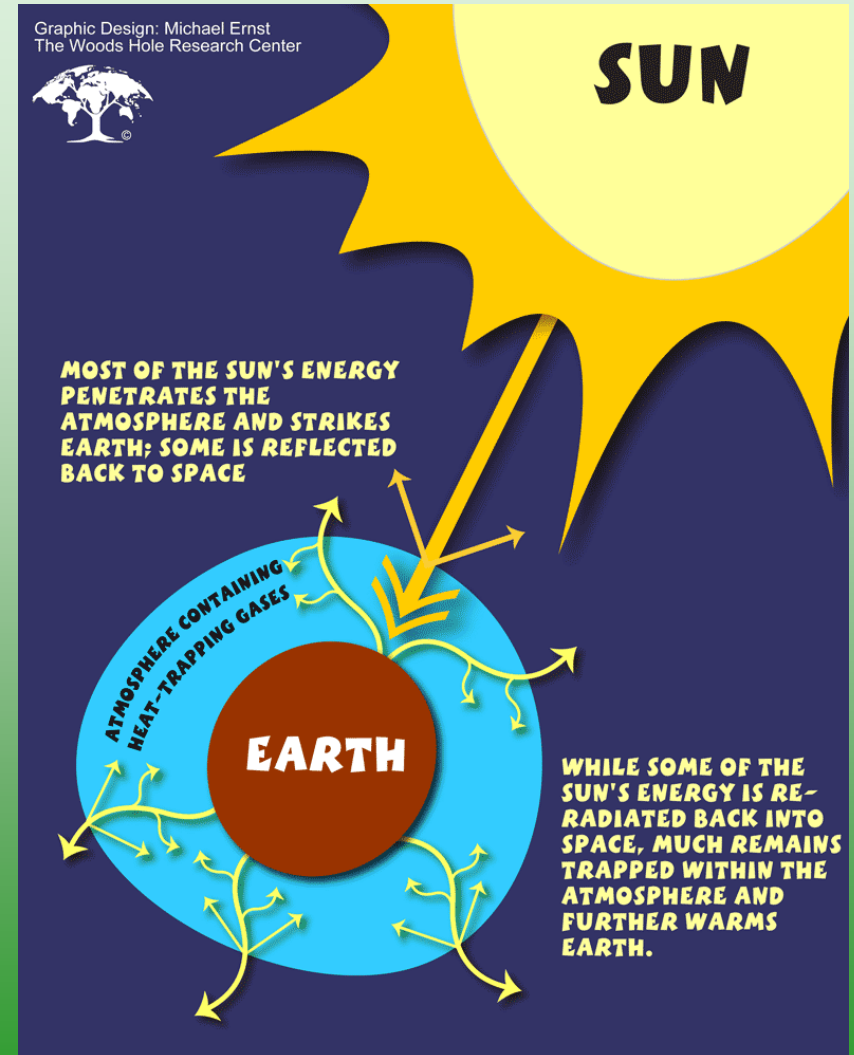
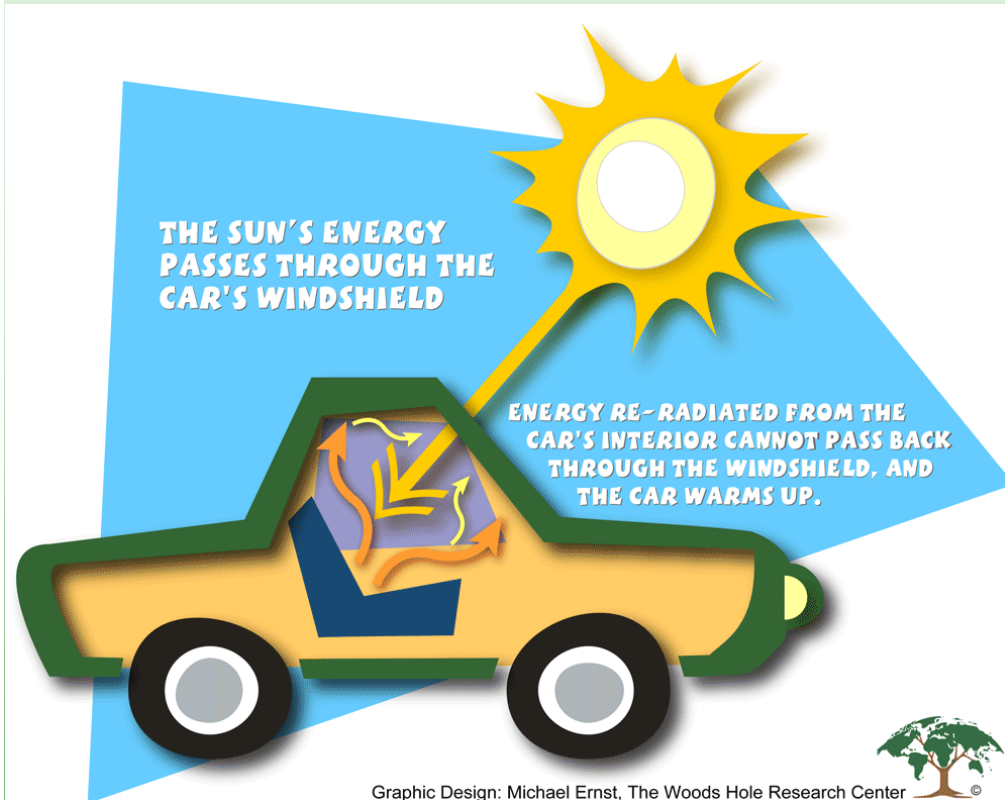




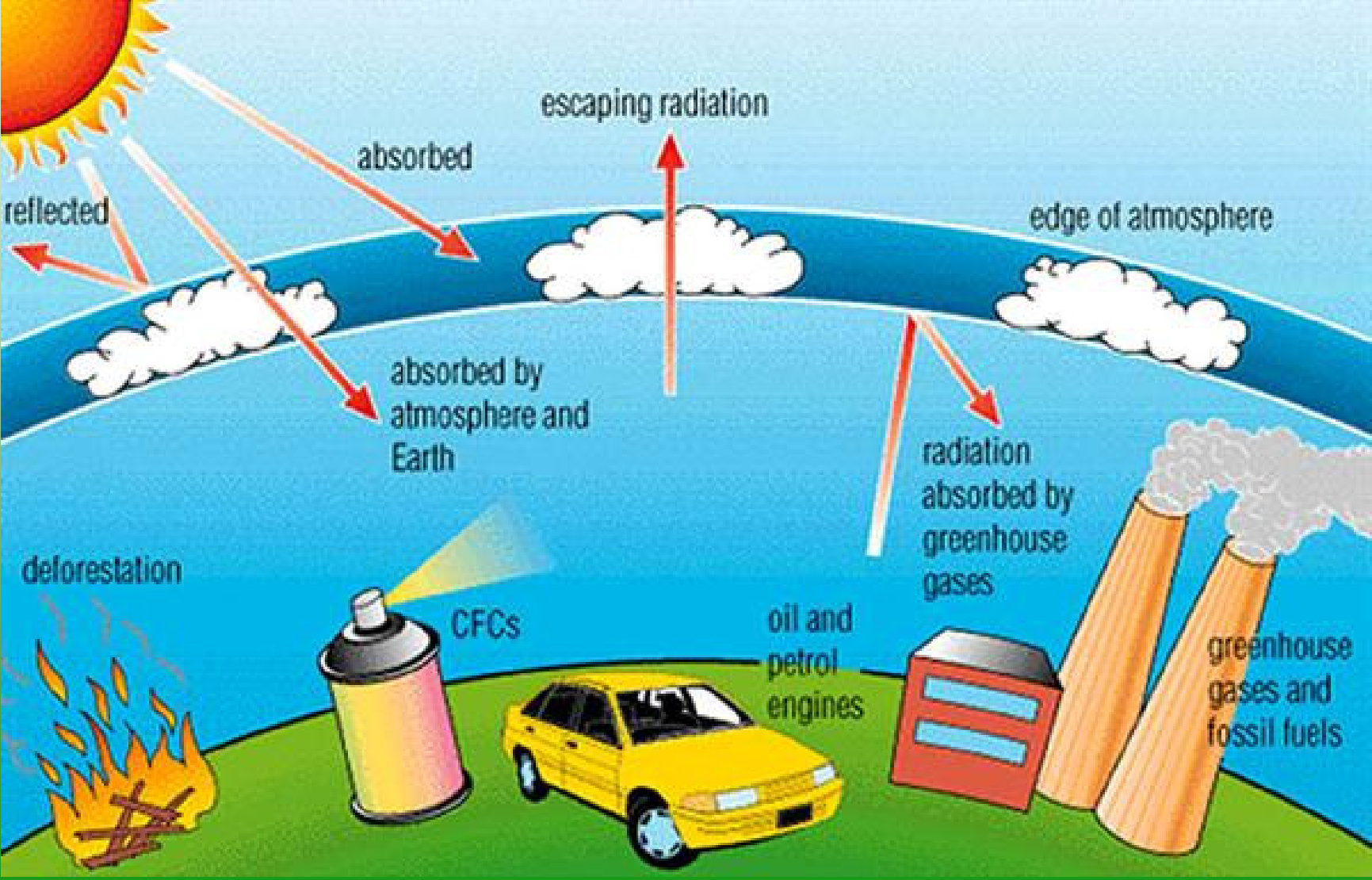




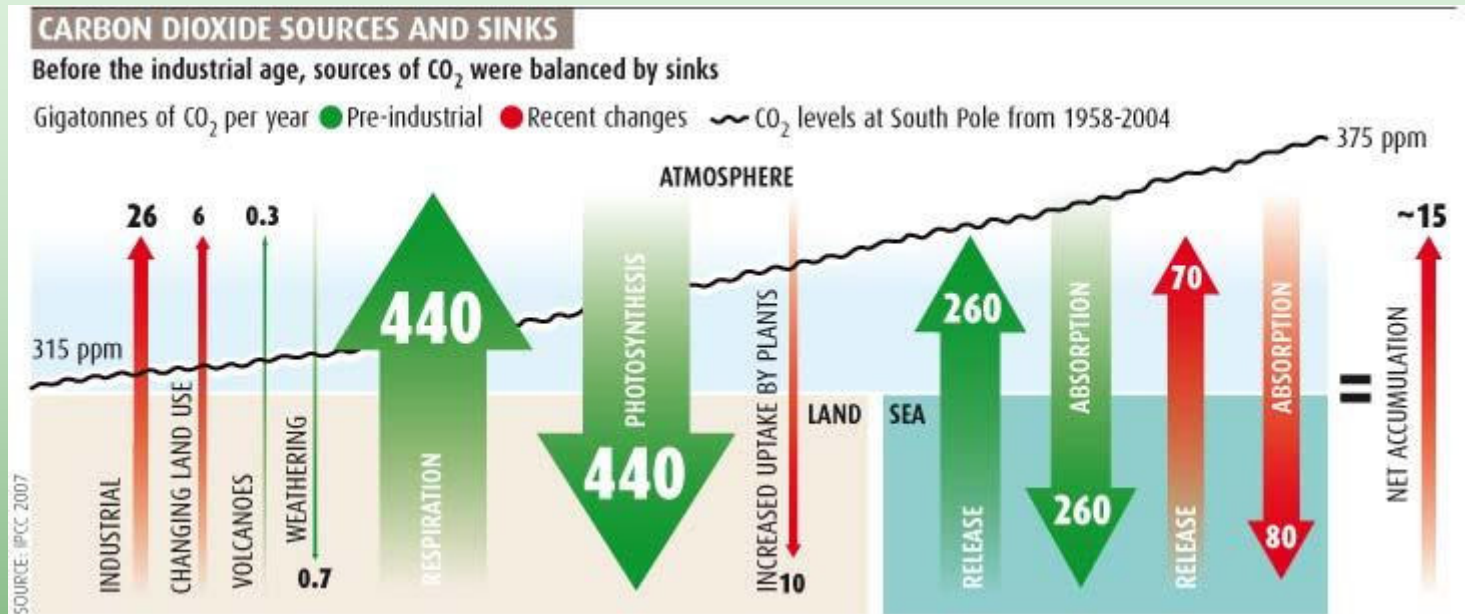
What is the greenhouse effect?



Anthropogenic Greenhouse Effect

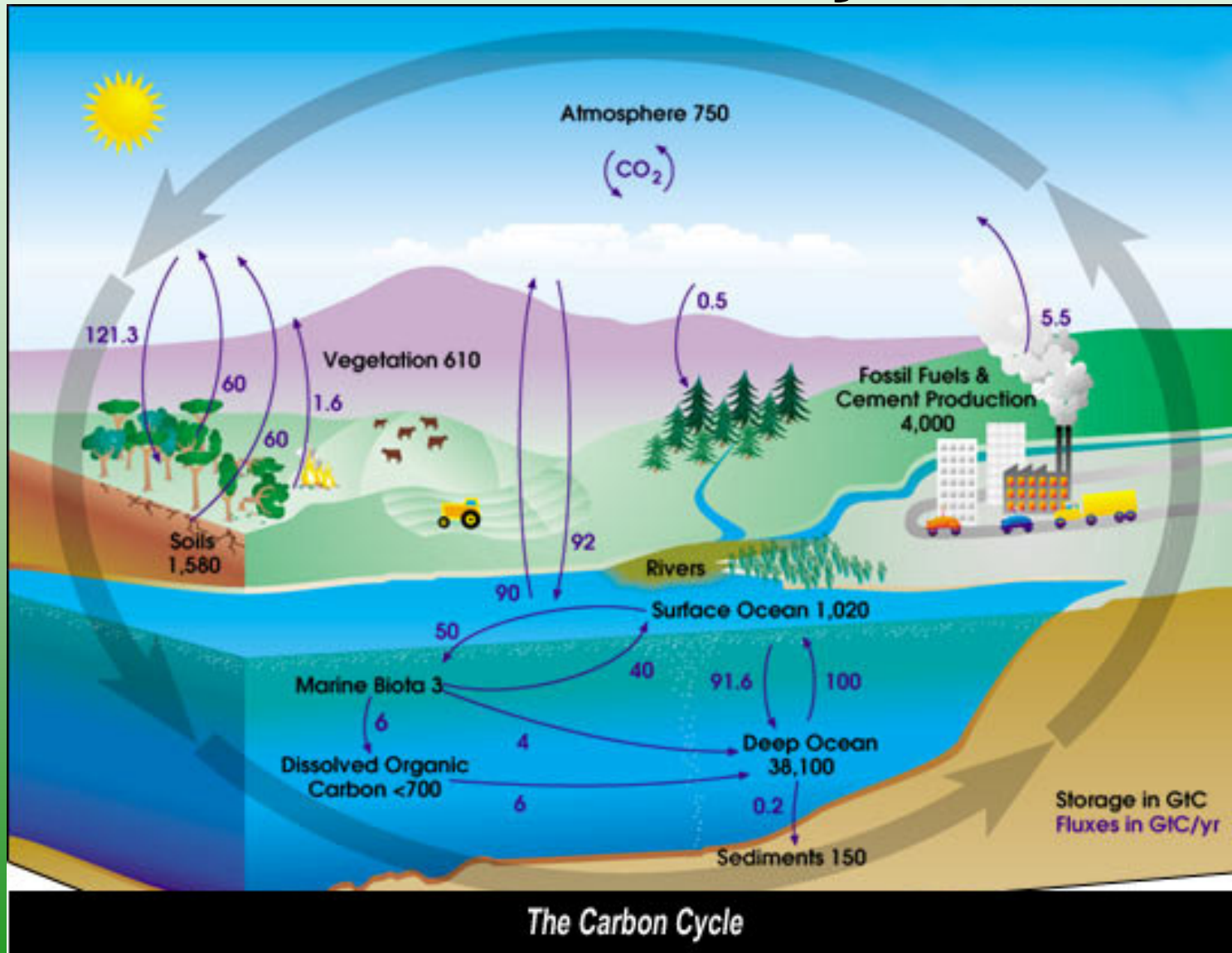


CO2 Sources and Sinks



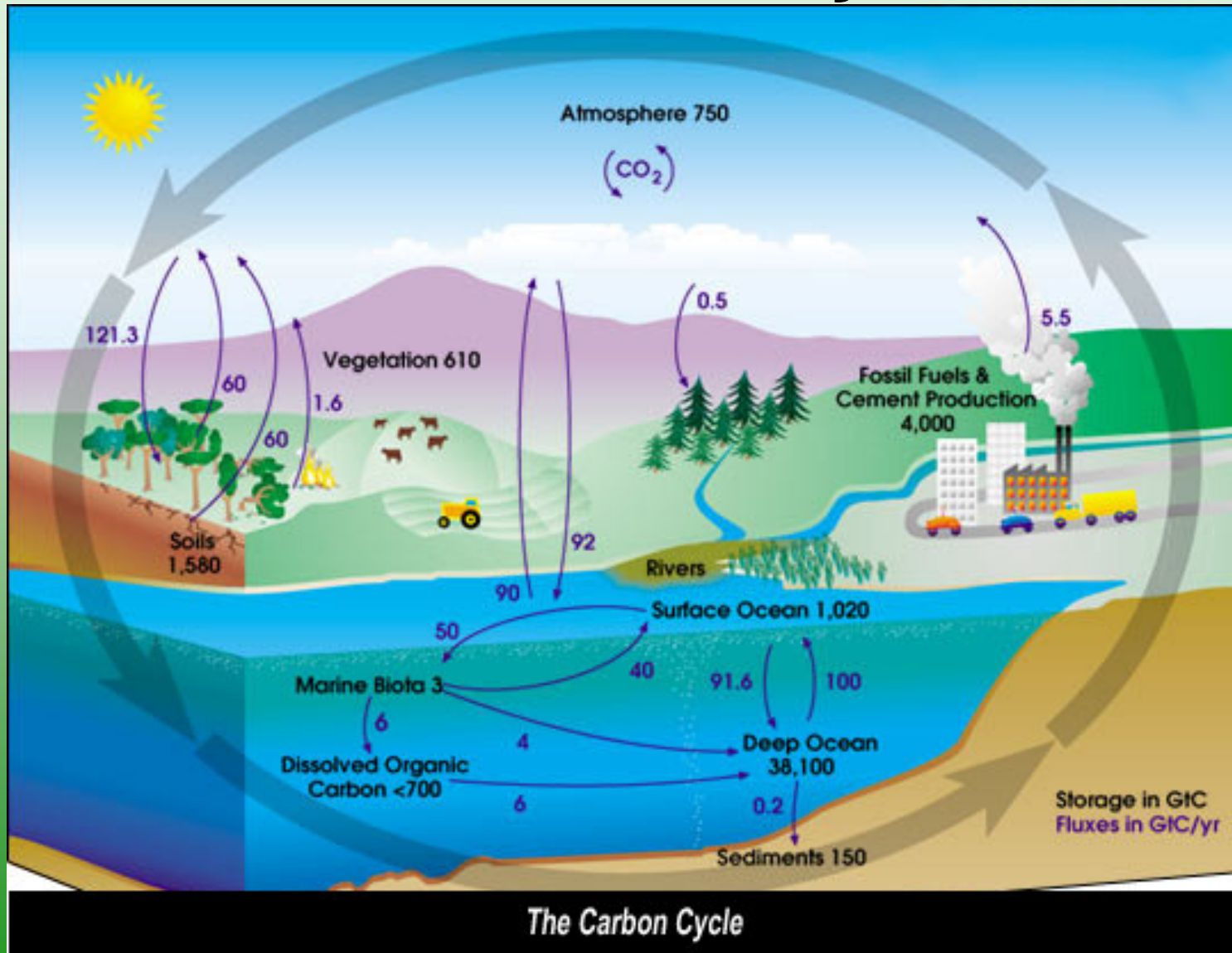
- Ice cores show that carbon dioxide levels in the atmosphere have remained between 180 and 300 parts per million for the past half-a-million years. In recent centuries, however, CO₂ levels have risen sharply, to more than 375 ppm.

The Carbon Cycle



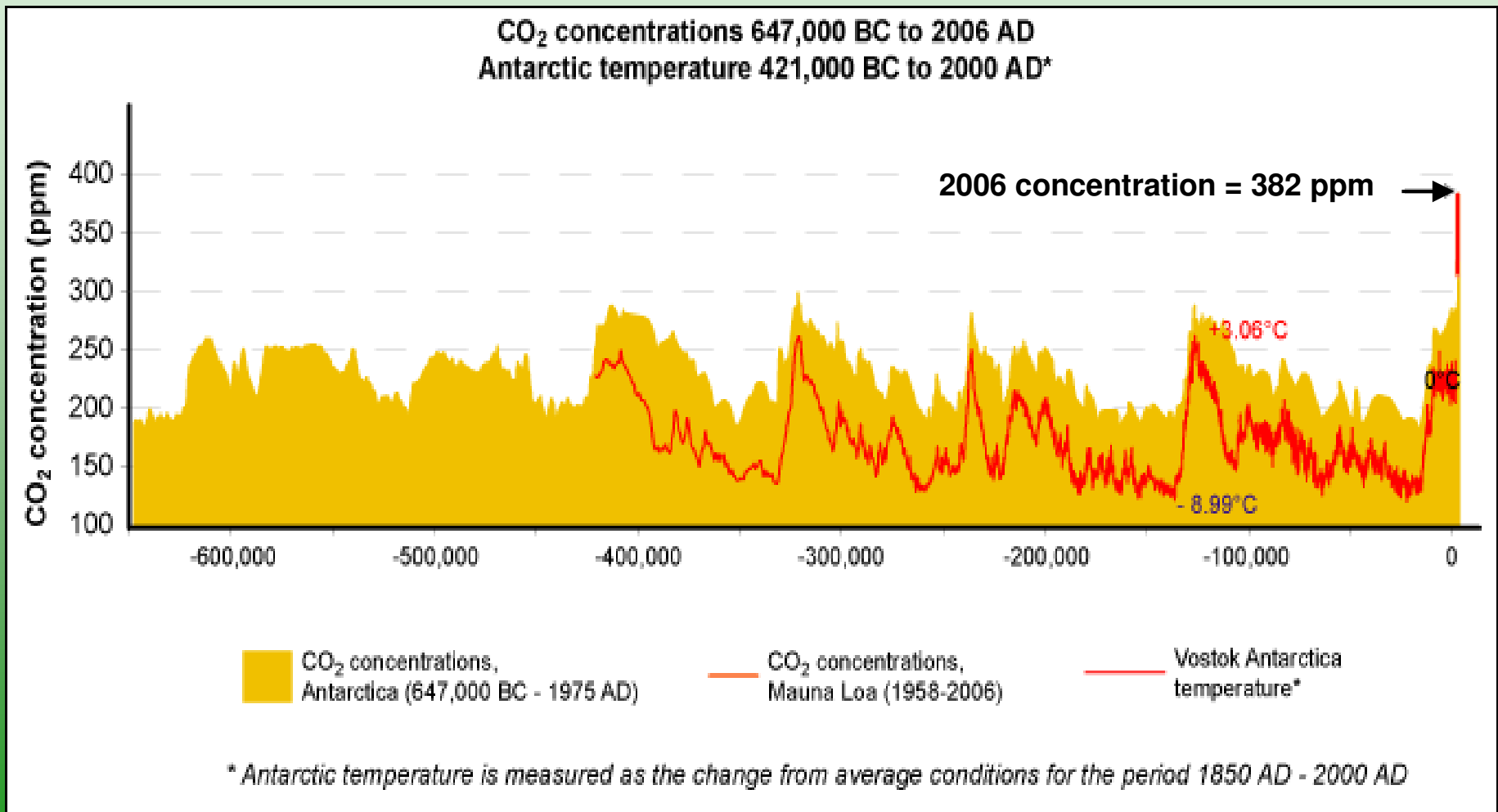
<http://maps.grida.no/go/graphic/greenhouse-effect>

The Carbon Cycle



<http://maps.grida.no/go/graphic/greenhouse-effect>

Climate Change (Global Warming / Global Wierding)



“Never before has humanity faced such a challenging outlook for energy and the planet. This can be summed up in five words: ‘more energy, less carbon dioxide’.”

- *Jeroen van der Veer,*

Chief Executive, Royal Dutch Shell, 2008

Evidence of Climate Change

- Temperatures across the globe are rising.
- The 1990s was the warmest decade in the past 1000 years.
- The world has warmed 0.74 °C (1.3 °F) in the past hundred years
- Sea surface temperatures have increased 0.4-0.8 °C (0.7-1.4 °F) since the late 19th Century
- Over the period 1961 to 2003, global ocean temperature has risen by 0.10 °C (0.18 °F) from the surface to a depth of 700 m.
- There are fewer frosts. Permafrost is melting
- Glaciers are retreating and sea ice is decreasing.
- Sea levels have risen 10 to 20 cm
- Increased heavy rainfall in some regions, less in others.

Permafrost



Permafrost is any rock or soil material that has remained below 32° F continuously for two or more years.

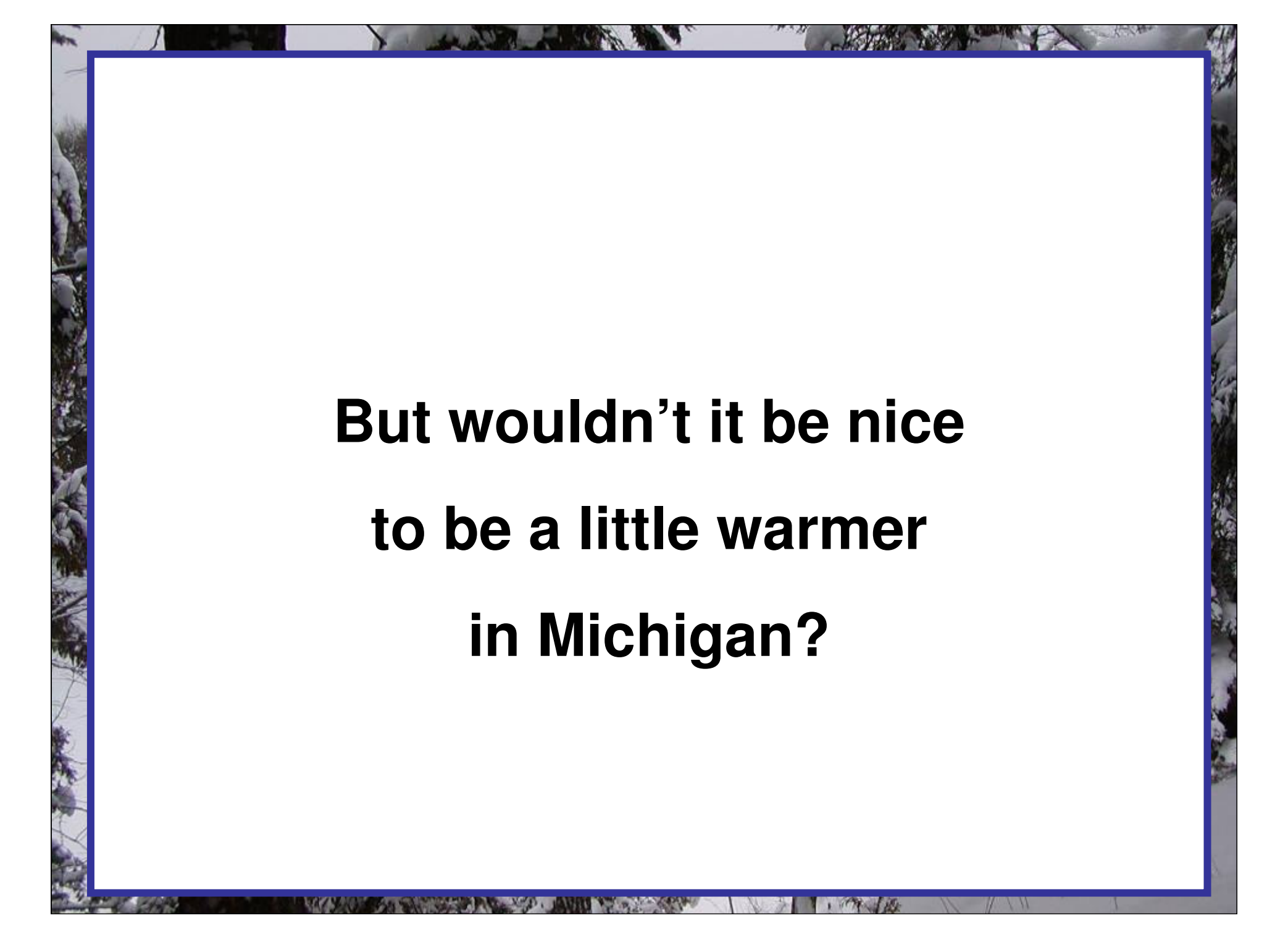
Is global warming already happening?

Examples of observed ecological changes

- Lengthening of the growing season in middle and high latitudes
- Poleward and upward shift of plant and animal ranges
- Decline of some plant and animal species
- Earlier flowering of trees
- Earlier emergence of insects
- Earlier egg-laying in birds

How Much Warmer Could it Get?

- Scientists predict global warming of 2.5°-10.4°F over the next 100 years.
- Even if we stopped emitting heat-trapping gases immediately, the climate would not stabilize for many decades.
- In the last 10,000 years, the Earth's average temperature hasn't varied by more than 1.8°F (1.0°C).
- Temperatures only 5°-9°F cooler than those today prevailed at the end of the last Ice Age, in which the Northeast United States was covered by more than 3,000 feet of ice.

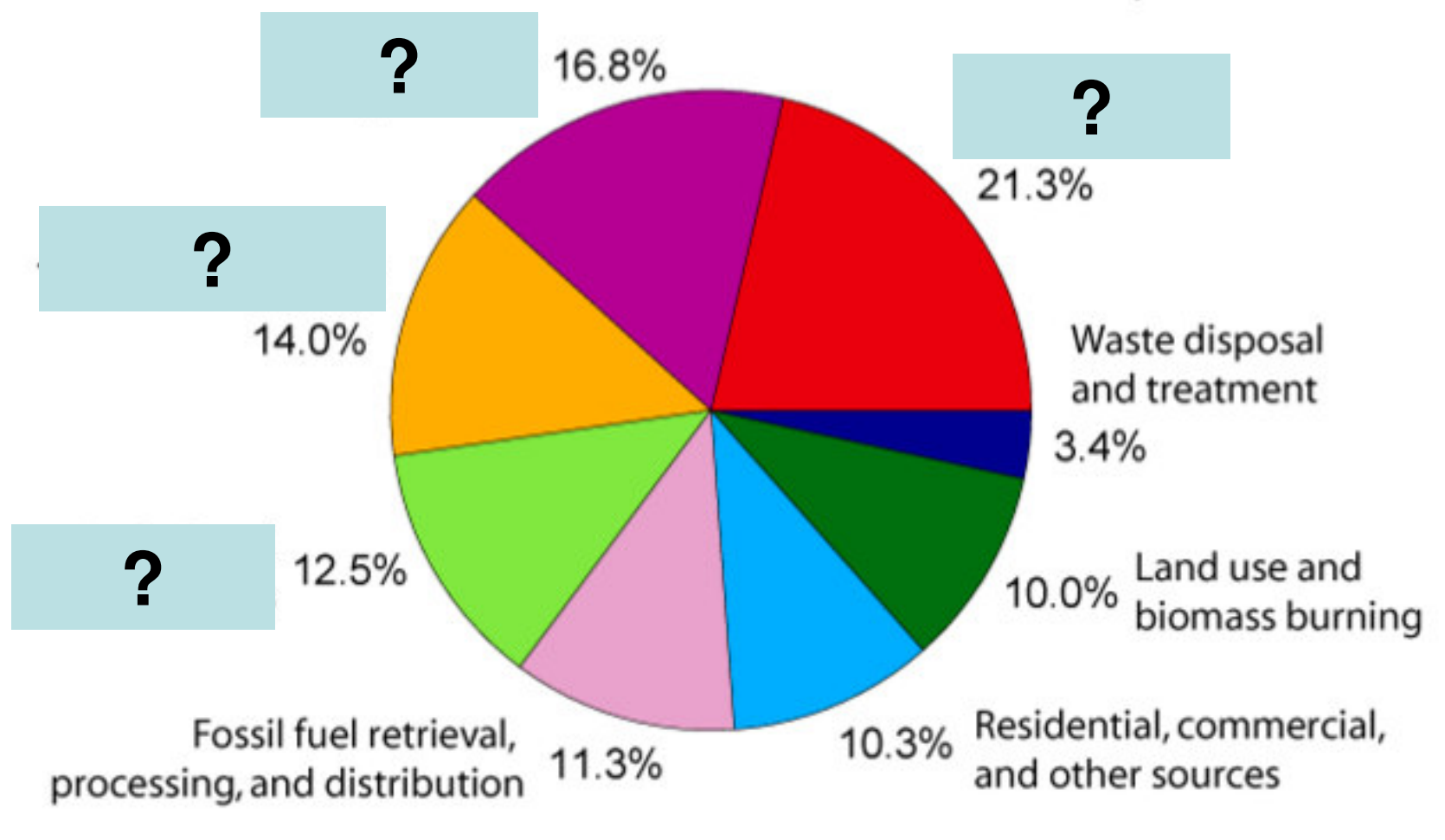


**But wouldn't it be nice
to be a little warmer
in Michigan?**

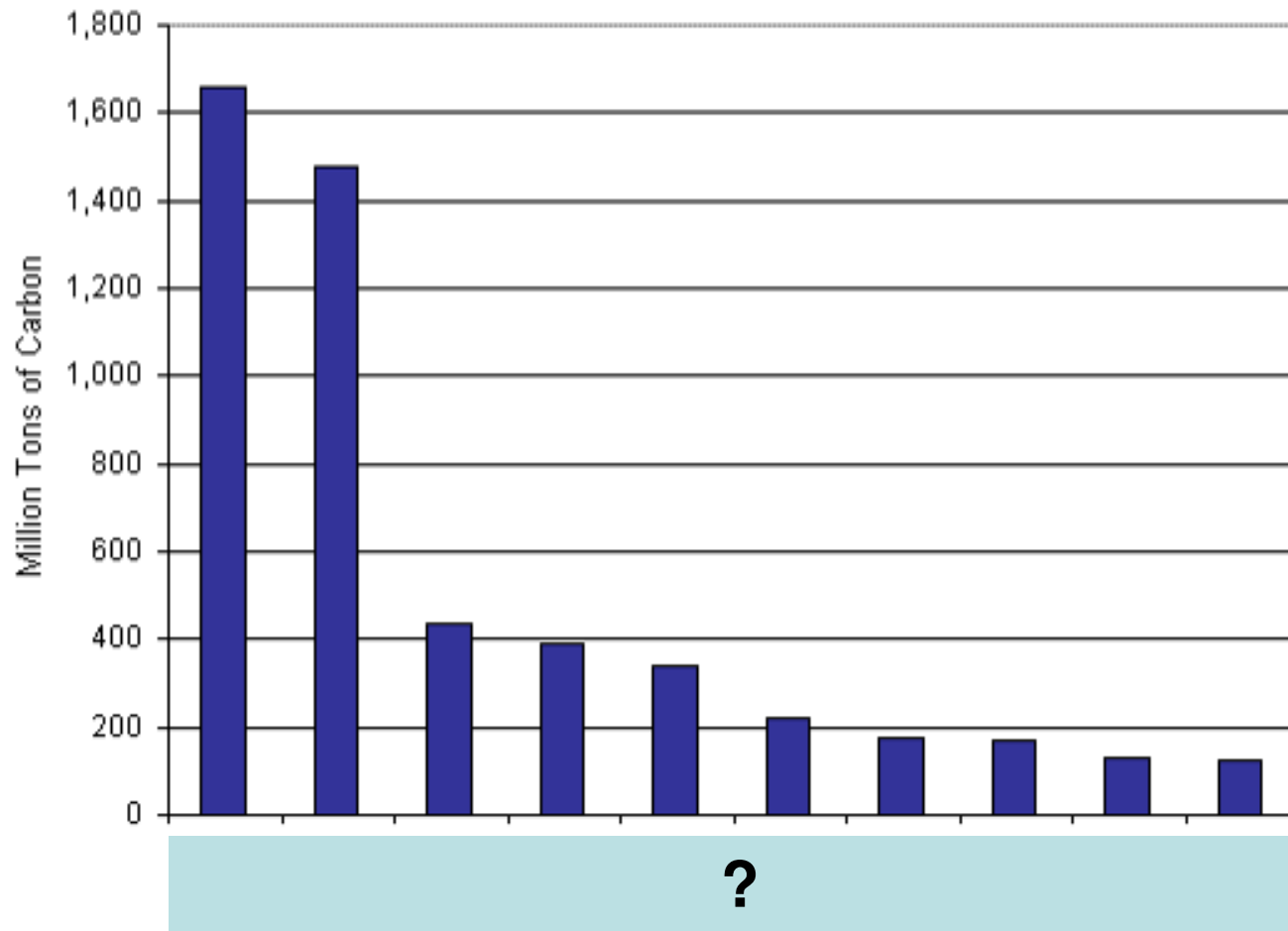
Likely result of a 2.5°-10.4°F temperature increase:

- A rise in sea level between 4 and 40 inches, leading to more coastal erosion, flooding during storms, and permanent inundation
- Severe stress on natural ecosystems - forests, wetlands, alpine regions
- Threats to human health as disease-carrying insects and rodents spread diseases over larger geographical regions
- Disruption of agriculture due to increased temperature, water stress, and sea-level rise in low-lying areas such as Bangladesh or the Mississippi River delta

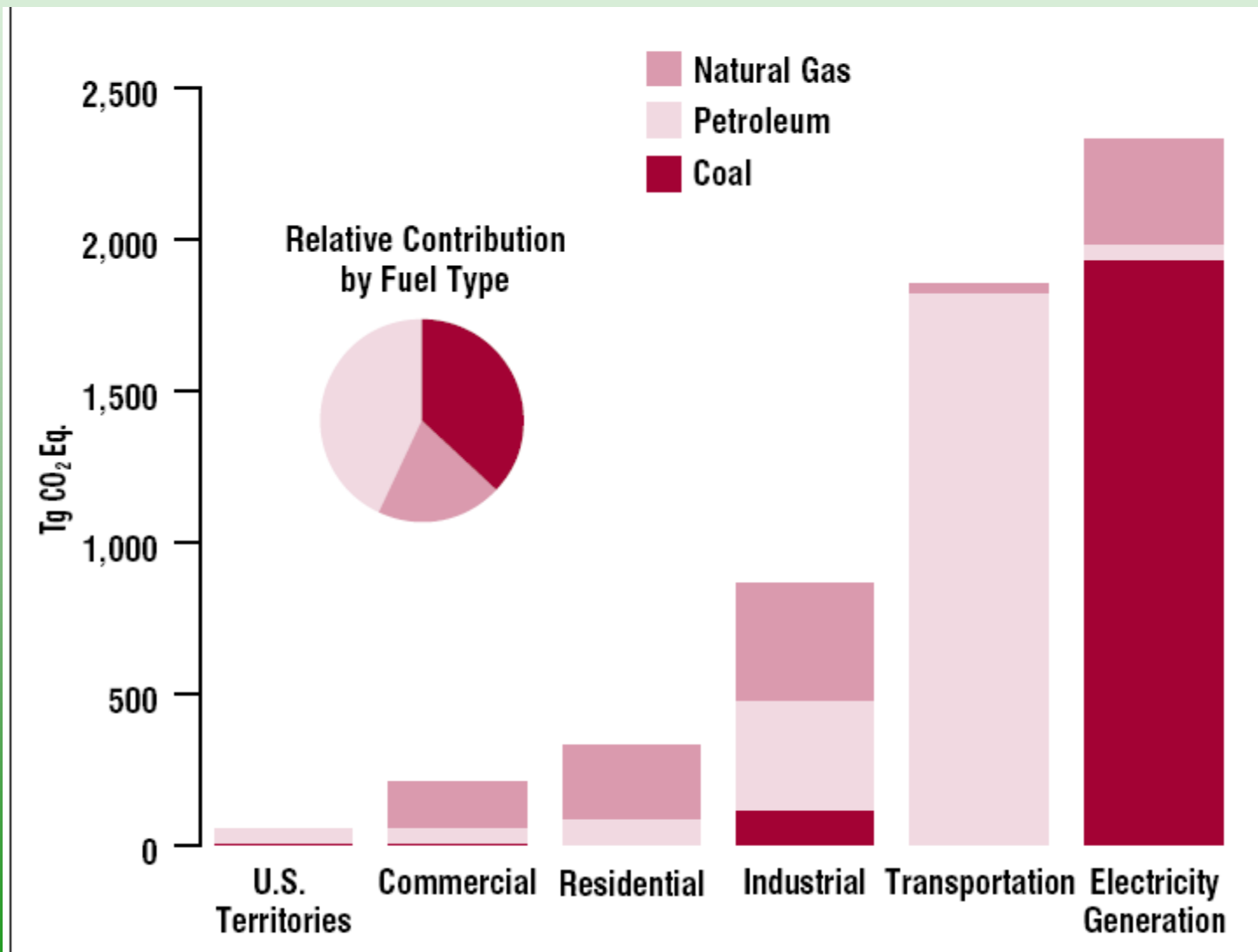
World Greenhouse Gas Emissions by Sector



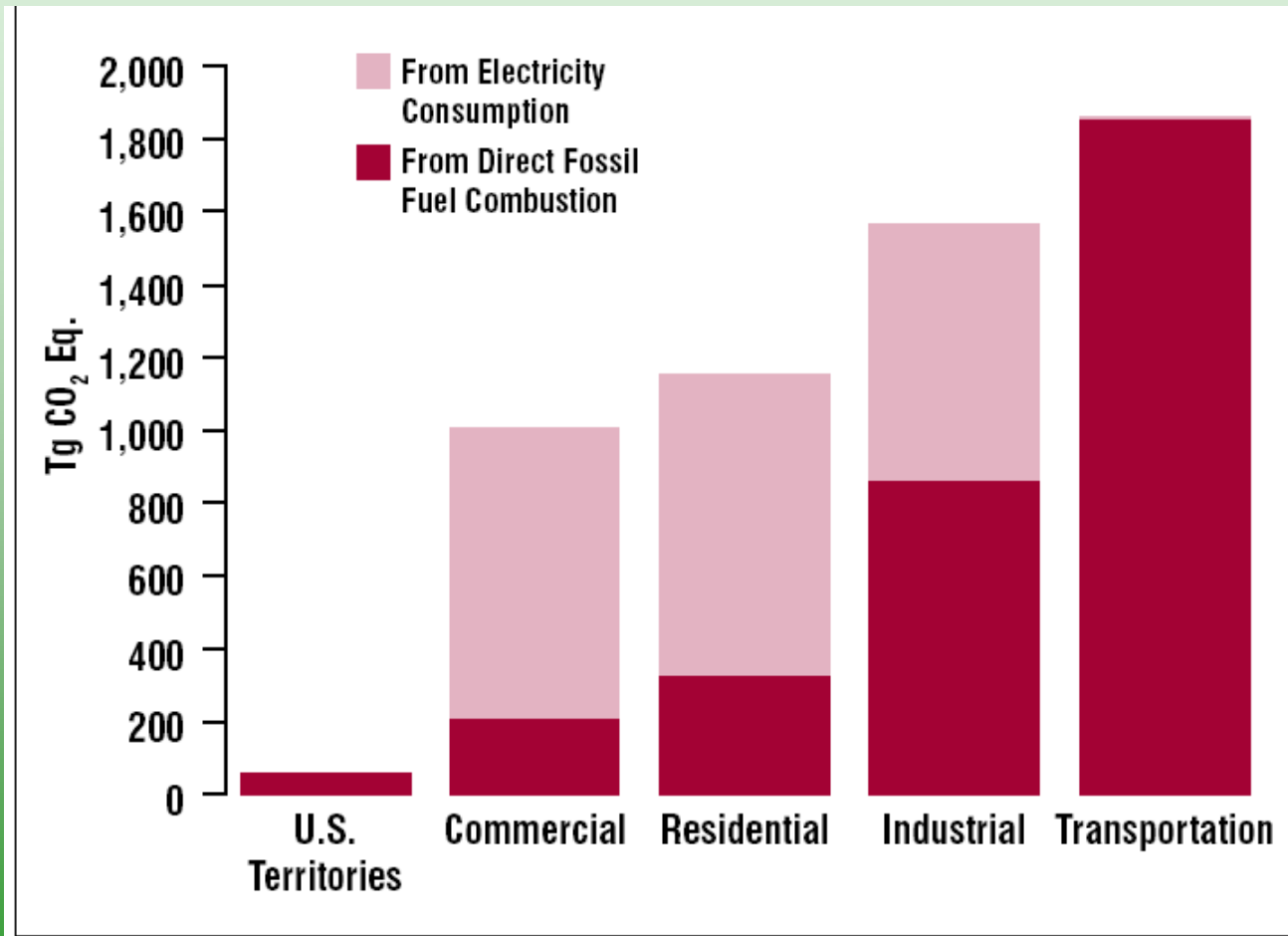
Carbon Dioxide Emissions from Fossil Fuel Burning, 2006



U.S. CO₂ Emissions from Fossil Fuel Combustion by Sector and Fuel Type



2006 End-Use Sector CO2 Emissions from Fossil Fuel Combustion



18%

20%

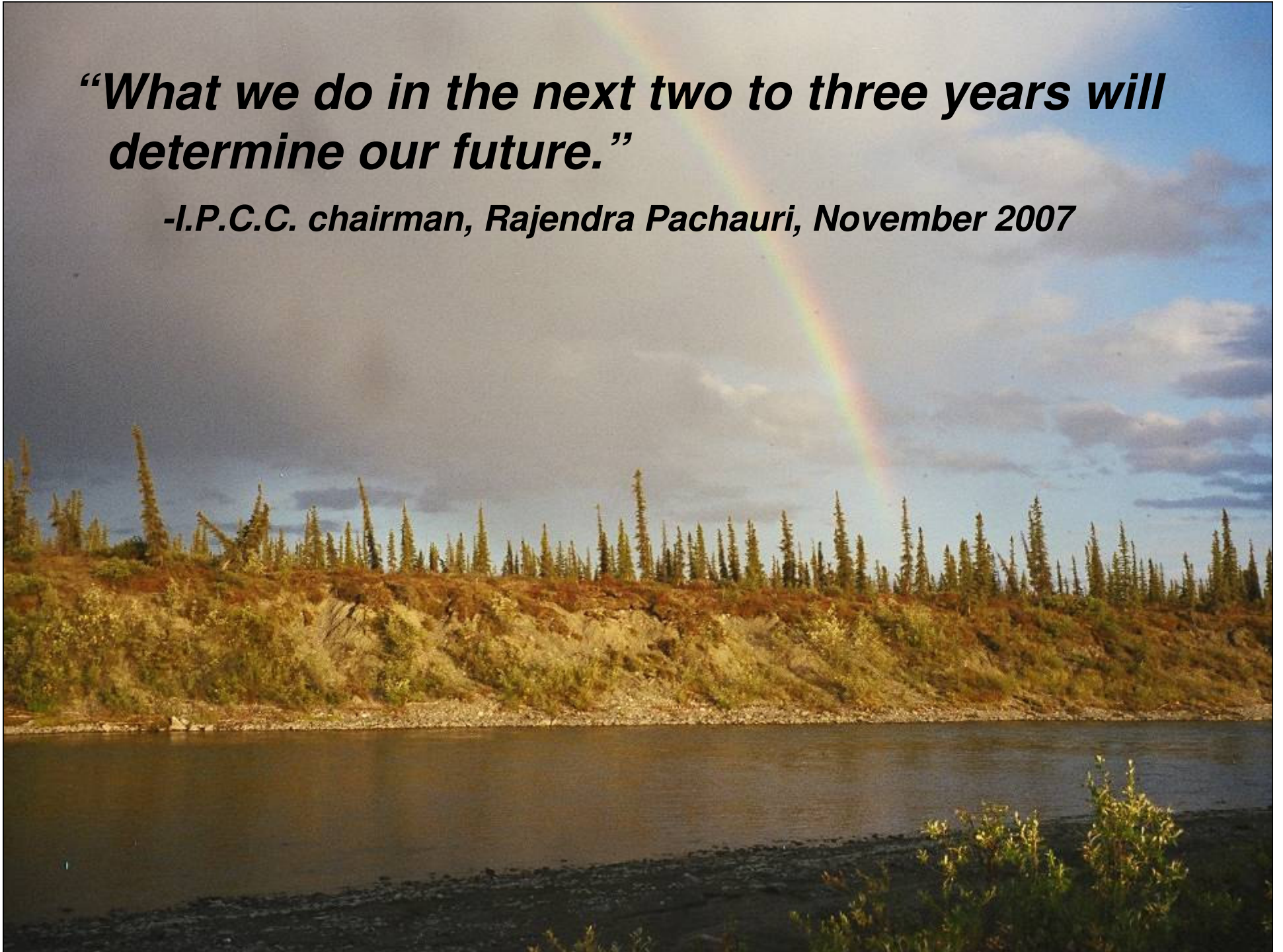
28%

33%

Percent of CO₂ from fossil fuel combustion in 2006

“What we do in the next two to three years will determine our future.”

-I.P.C.C. chairman, Rajendra Pachauri, November 2007



If Global Warming Went Away Could We Forget the Environment?

- The end of oil, rising food prices
- Water tables dropping, lakes disappearing
- Disappearing forests, cropland and rangeland
- Disappearing fisheries, extinction of bird, amphibian and mammal populations
- Growing population, poverty, hunger, disease
- Increasing numbers of “failed states”, threatening world order
- “Tipping points” from which recovery is unlikely

Keep Every Cog...



Intelligent Tinkering

The last word in ignorance is the man who says of an animal or plant: "What good is it?" If the land mechanism as a whole is good, then every part is good, whether we understand it or not. If the biota, in the course of aeons, has built something we like but do not understand, then who but a fool would discard seemingly useless parts? **To keep every cog and wheel is the first precaution of intelligent tinkering.**

Leopold, Aldo: [*Round River*](#) 1993

Reading Assignment



THOMAS L.
FRIEDMAN

*Hot, Flat,
and Crowded*

WHY WE NEED A GREEN REVOLUTION—
AND HOW IT CAN RENEW AMERICA



SUBSTANTIALLY REVISED

PLAN B 3.0

MOBILIZING TO SAVE CIVILIZATION

LESTER R. BROWN

"We should all heed Brown's advice."
—President Bill Clinton



Unconventional “Solutions”



“Bike Pooling”

Renewable Energy Washing Machine



Lehman's

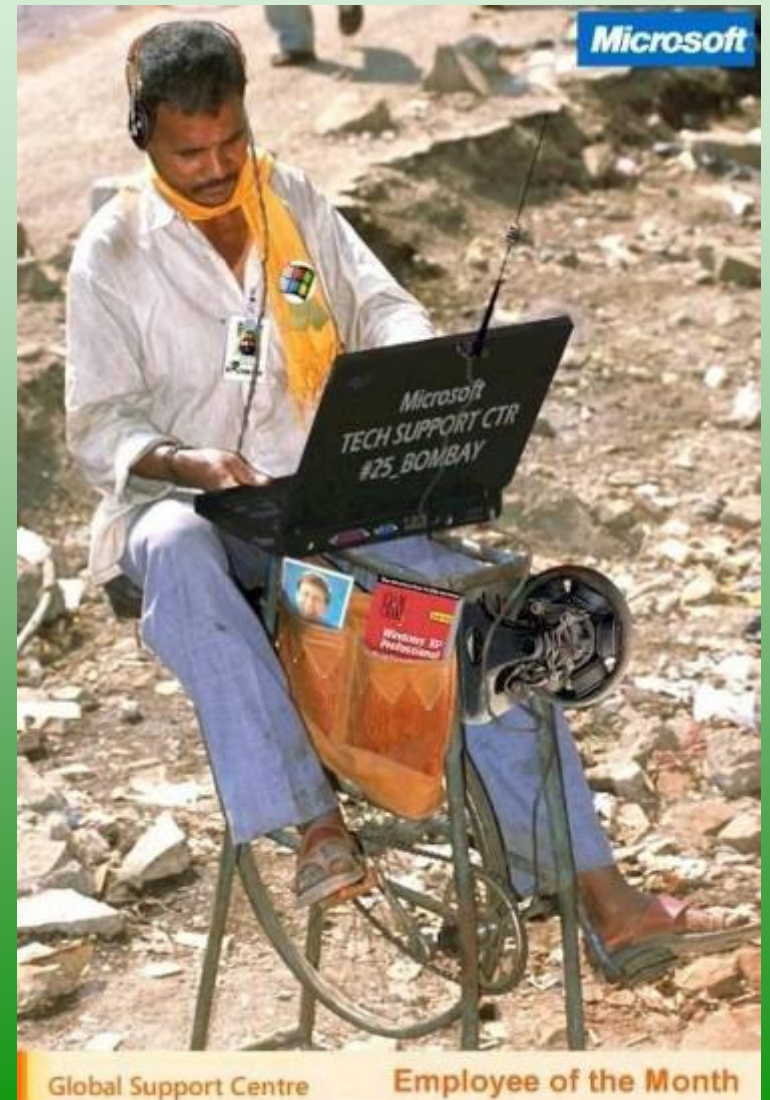
Unconventional “Solutions”



Harley Palangchao



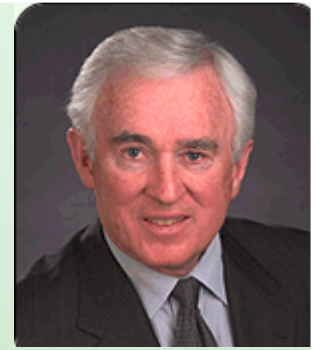
10,000 mpg eco-marathon cars



Global Support Centre

Employee of the Month

The ACUPCC Commitment

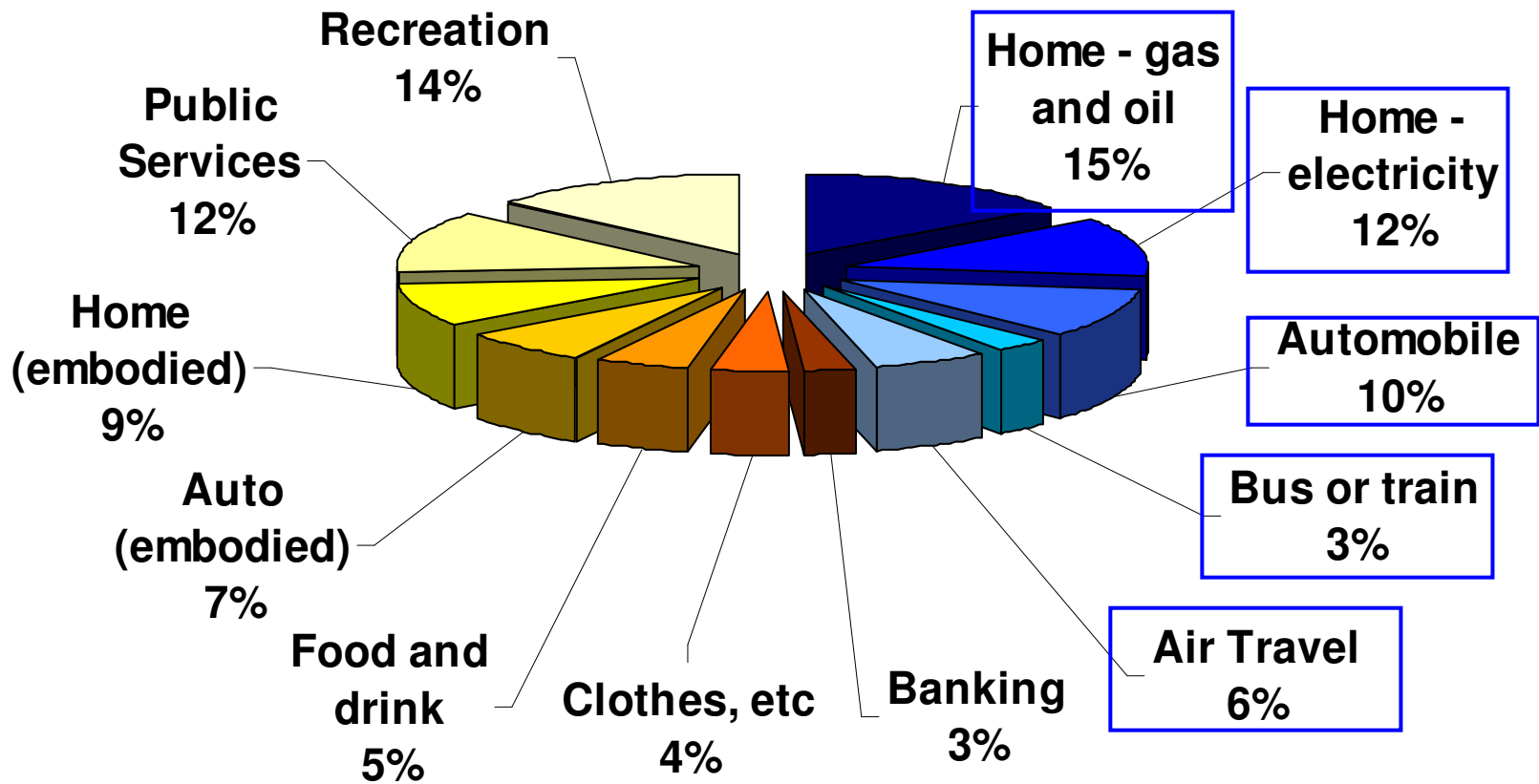


1. Create a **task force** to guide and implement the plan, including staff, faculty, student, and administrator representatives.
2. Complete a comprehensive inventory of all greenhouse gas emissions.
3. Develop an **action plan** for becoming climate neutral, as soon as possible
4. Make climate neutrality and sustainability a part of the **curriculum** for all students.

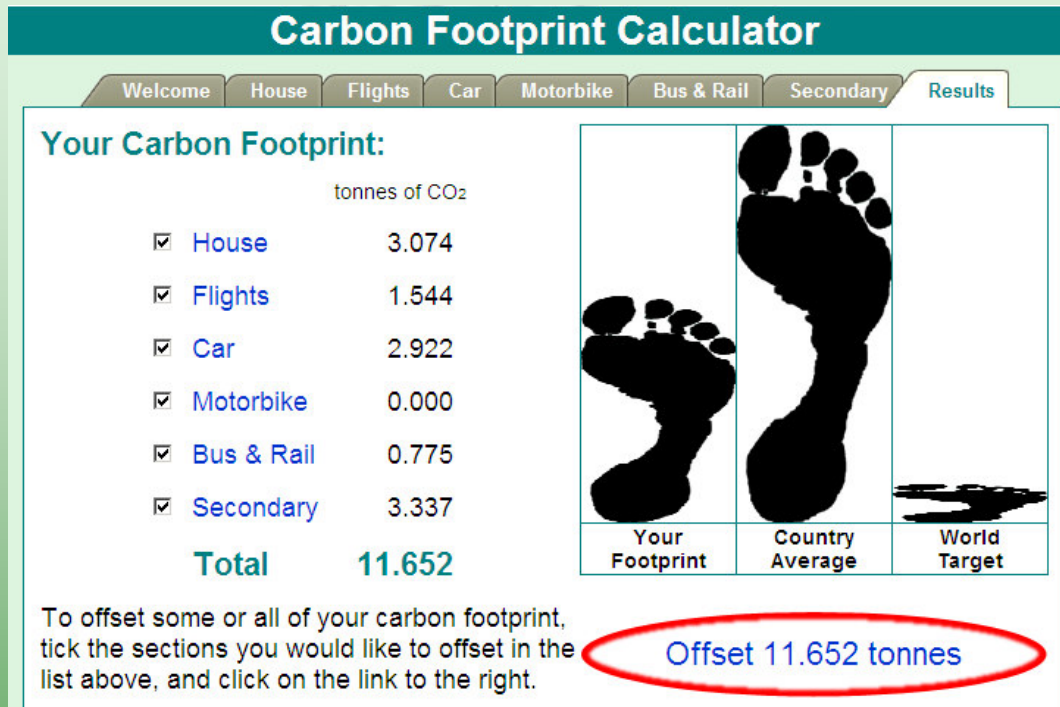
Personal Carbon Footprint (Greenhouse Gas Inventory)

Secondary footprint
- whole product life cycle

Primary footprint
- burning of fossil fuels



Personal Carbon Footprint



www.carbonfootprint.com/calculator.aspx

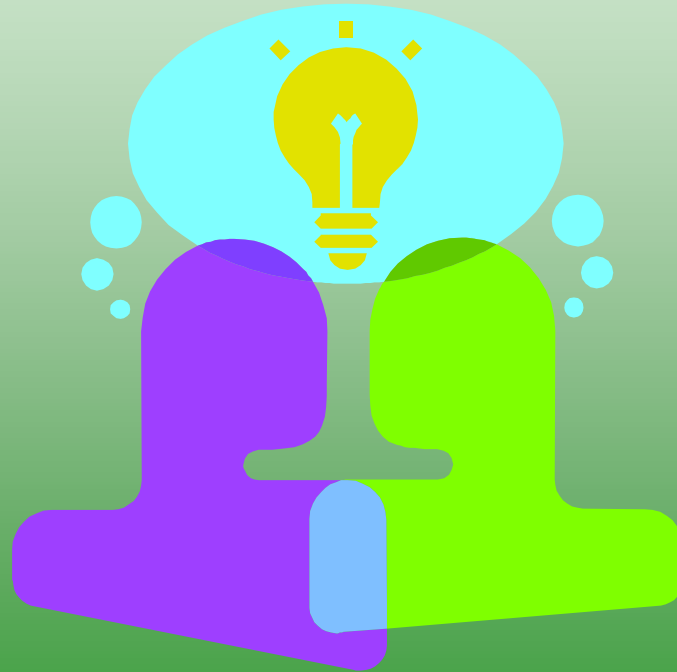
www.epa.gov/climatechange/emissions/ind_calculator.html

www.earthday.net/footprint/index.html

www.nature.org/initiatives/climatechange/calculator/

How does your footprint match up?

Share What you Learned with a Neighbor



How Much Should I Reduce?

To give ourselves a 50% chance at preventing serious climate change:

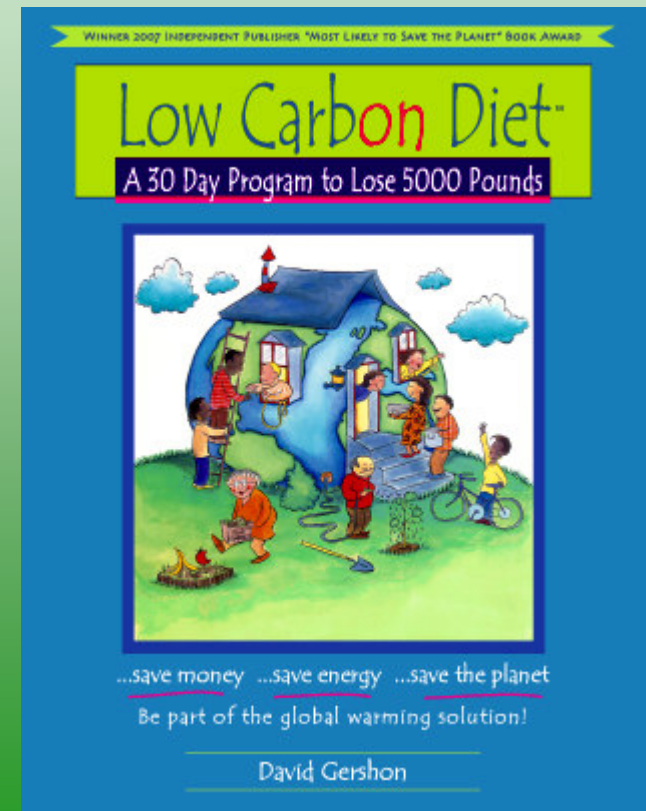
- Reduce 20% below 2000 levels by 2020
- Reduce 80% below 2000 levels by 2050
- The European Union is committed to this.
- Many states in the U.S. have set global warming targets, but the federal government has not.

Low Carbon Diet: A 30 Day Program to Lose 5000 Pounds - Be Part of the Global Warming Solution!

- [*David Gershon on the Low Carbon Diet*](#)



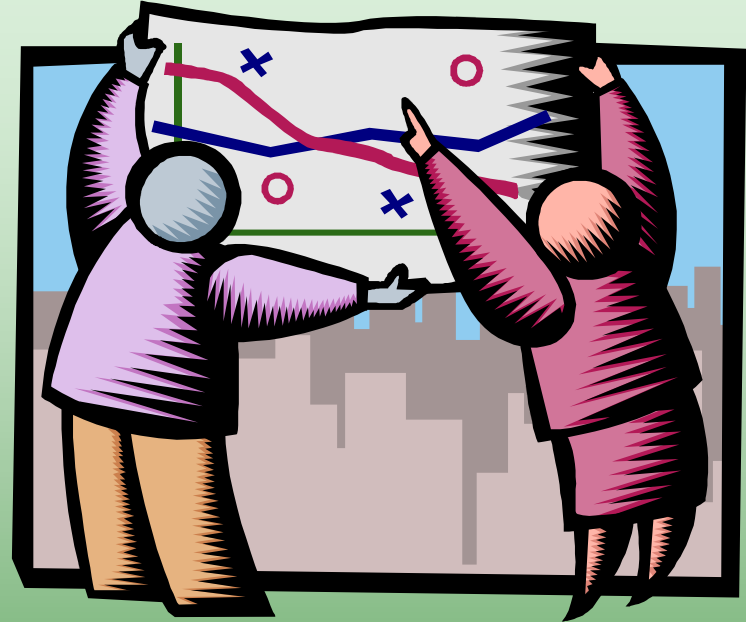
[www.youtube.com/watch?
v=2xMMkJZpzs0](http://www.youtube.com/watch?v=2xMMkJZpzs0)



How Can I Lose 5000 lb in 30 days?

- Hot water & laundry
- Home heating and cooling
- Transportation
- Electricity
- Food
- Offsets

Form Breakout Groups and Strategize



What Are We Doing at WCC?

- ACUPCC
- Recycling
- Energy management
- Water conservation
- Native plant landscaping
- LEEDs building standards
- Student Activities
- Environmental Committee
- Sustainability in the curriculum



How does one conduct a campus-wide emissions inventory?

Basically, there are three elements to the greenhouse gas emission inventory process:

- **Data collection**
- **Calculating greenhouse gas emissions**
- **Analyzing and summarizing the results**



Calculating the College's CO2 Footprint

Scope 1 includes all direct sources of Greenhouse Gas (GHG) emissions from sources that are owned or controlled by an institution, including: production of electricity, heat, or steam; transportation of materials, products, waste, and community members; and emissions from unintentional leaks.

Scope 2 includes indirect GHG emissions from imports of electricity, heat or steam – generally those associated with the generation of imported sources of energy.

Calculating the College's CO2 Footprint

Scope 3 - includes all other indirect sources of GHG emissions.

- business travel
- the commuting of students, staff and faculty
- outsourced activities and contracts
- methane emissions from land-filled waste

<http://www.cleanair-coolplanet.org/toolkit/index.php>

University of Pennsylvania

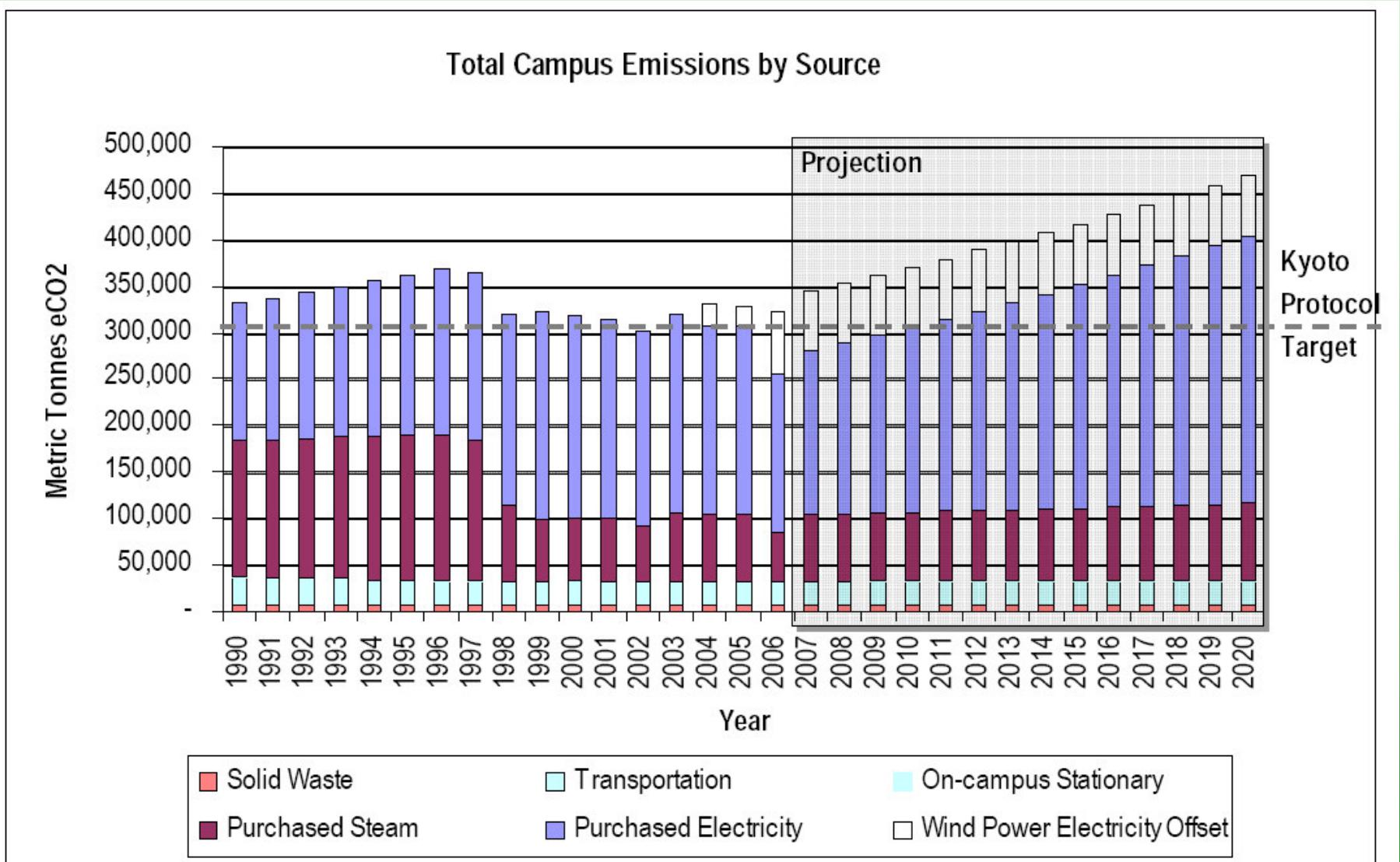


Fig. 2.9.1 Total Campus Greenhouse Gas Emissions, 1990-2020.

Office and Classroom Paper and Containers Recycling

- Recycling totals for 2006:
 - 40 tons of mixed paper
 - 40 tons of cardboard
 - 4.7 tons of cans and bottles





STOP THINK RECYCLE!

HERE CONTAINERS

RECYCLE THESE ITEMS

MILK CARTONS

JUICE BOXES *(no straws)*

GLASS BOTTLES

ALUMINUM & STEEL

Pop Cans
Aluminum Cans
Clean Foil
Metal Jar Lids
Clean Pie Tins

PLASTIC BOTTLES

Marked or on bottom

*(Only bottle shaped plastics are recyclable. The mouth must be smaller than the base.)
Please remove all lids*

DO NOT RECYCLE THESE ITEMS

Styrofoam/Plastic Cups
Plastic Utensils or Plates
Containers that have held a toxic material
Dirty Containers
Yogurt containers
Oil Containers
Plastic Bags
Plastic Lids

QUESTIONS?

Contact Barry Wilkins:
677-5312, blw@wccnet.edu



STOP THINK RECYCLE!

HERE PAPER

RECYCLE THESE ITEMS

SCHOOL & OFFICE PAPER

White Paper
Colored Paper
Copy Paper Wrappers
Photocopies
File Folders
Junk Mail
Manila Envelopes
Blueprints
Laser Prints
Cardstock
Post-It Notes
Envelopes
Window and non-window
Paper Bags

Staples, paper clips, and tape are OK.

MAGAZINES

GLOSSY CATALOGUES

PAPERBACKS

PHONE BOOKS

HARD COVER BOOKS

Take books to SCB drop box next to bookstore. Call ext: 5300 for pick up.

NEWSPAPERS

BOXBOARD

Empty & flattened

Notepad Backs

Tissue Boxes

Cereal Boxes

Bag shredded paper separately.

DO NOT RECYCLE THESE ITEMS

Freezer Food Boxes
Paper Cups
Paper Plates
Tissue
Napkins

QUESTIONS?

Contact Barry Wilkins:
677-5312, blw@wccnet.edu



'Technotrash' Recycling

- 🌍 Overhead transparencies
- 🌍 Ink jet cartridges
- 🌍 CDs, DVDs, video
and audio tapes,
- 🌍 Floppy disks
- 🌍 Cell phones
- 🌍 Batteries



Use the bins located outside the bookstore to dispose of these items.



Other Recycling

- **Styrofoam** peanuts - reused for shipping, sent to private shippers like Mailboxes Etc
- **Cardboard** boxes – recycled or reused for shipping
- **Pallets** – reused by shippers, reclaimers, individuals
- **Computers** – resold to students
- **Toner and ink cartridges** – recycled
- Lost and found **Clothing** – taken to Salvation Army
- **Universal waste** – sent to DEQ recognized reclaimer
- **Equipment and furniture** – sold on Ebay, donated to non-profits, or taken to the Ann Arbor Re-Use Center





WCC Operations

- Adjusting thermostats (76 °F summer / 68 °F winter)
- Energy efficient variable speed pump and fan motors
- Energy efficient fluorescent lights and ballasts
- Waterless urinals and dual-flush toilets
- Turning off building lights after hours
- Using only low VOC paints and carpeting
- Plexus software for controlling parking lot lights
- Room occupancy sensors



**Knowledge is power...
Turn everything else off**



Power Off Reminder Magnet

Building to LEED standards

- Fitness Center – LEEDs Gold certified



- TI Building renovation – aiming for LEEDs Silver

CNN.com.

AMERICAN MORNING

Member Center: [Sign I](#)

SEARCH



THE WEB



CNN.COM

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World

U.S.

Weather

Business

Sports

Ana

UPDATED: 3:26 p.m. EST, February 5, 2007



Encouraging Low Carbon Transportation



...naked some financial services and parcel deliveries on the disabled list from the northern Plains across the Great Lakes.



Native Plant Landscaping

- Reduced pesticide use
- Improved water retention
- Increased biological diversity
- Reduced goose pollution



Zero Waste Events

- Cheers Picnic
- Your next event?



What Else Could WCC be Doing?

Consider Michigan's Resources

- Fresh water
- Fish
- Farmland
- Crop diversity second only to California
- Industrial capacity
- Education
- Wind
- Sun

Sustainable Agriculture



- Preserve farmland
- Reduce pesticide use

- Support local jobs
- Keep money in Michigan



Solar Car Competition



Solar Panel Installation



Wind Turbine Installation

Swift Wind Turbine

- Grand Rapids, MI



Harvest Wind Farm

- Pigeon, MI

OEB Green Roof?



Green Roof at the Rouge

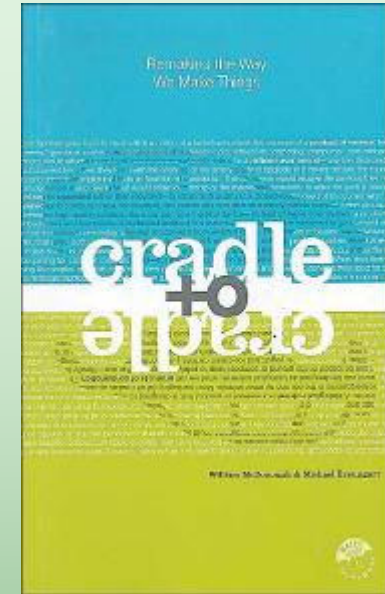
- Designed by William McDonough for the Ford Motor Company plant in Dearborn, MI.
- Green roofs also feature strongly in the cities he's designing for China.

Their benefits are obvious: They improve air quality, restore migratory patterns for birds, and look a lot better than black tar.



Multi-media Assignment

Cradle to Cradle, William McDonough



**The Next Industrial
Revolution:** McDonough
and Braungart and the Birth
of a Sustainable Economy,
Narrated by Susan Sarandon
(DVD)



<http://www.thenextindustrialrevolution.org/>